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THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN SECONDARY EDUCATION EXAMINATION

732/1

CHEMISTRY 1

Time: 3 Hours

Monday, 14th May 2012 a

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in sections A and **two (2)** questions from each of sections B and C.
3. Section A and B carry **thirty (30)** marks each and section C carries **forty (40)** marks.
4. Cellular phones are **not** allowed in the examination room.
5. Mathematical Tables and Non- programmable calculators may be used.
6. Write your **Examination Number** on every page of your answer booklet(s).
7. The following constants may be used:

Atomic masses:

H = 1; C = 12; O = 16; Na = 23.

1 Litre = $1dm^3 = 1000\ cm^3$.

Nernst's equation, $E^{\circ}_{(cell)} = \frac{0.0257V}{n} \ln X$

SECTION A (30 Marks)

Answer all questions in this section.

1. Give the meaning of the following terms:
   (a) Radioactive decay.
   (b) Radioactive isotope.
   (c) Radioactivity.

2. What do you understand by the following terms as applied in chemistry subject tests?
   (a) Standard deviation.
   (b) T- score.
   (c) Hallow effect.

3. (a) Define the term 'heat of solution'.
   (b) Giving one reason, state whether the heat change values of each of the following reactio is exothermic or endothermic:
   (i) $NaCl_{(s)} + H_2O_{(l)} \rightarrow NaCl_{(aq)}$ $\Delta H = 4.97 kJ/mol.$
   (ii) $HCl_{(g)} + H_2O_{(aq)} \rightarrow Cl_{(aq)}$ $\Delta H = -72.37 kJ/mol.$

4. Giving one example for each, differentiate between homolytic bond fission from hetero bond fission.

5. (a) Define 'Ferromagnetic' substance.
   (b) Complete the following chemical equations:
   (i) $AgNO_{3(aq)} + NH_{3(aq)} \rightarrow$
   (ii) $Cu^{2+}_{(aq)} + NH_{3(aq)} \rightarrow$

6. (a) Name three items which are required during preparation of the Scheme of Work.
   (b) State the use of each item named in (a) above.

7. (a) Imagining that you are teaching Form II class, identify the major blocks of Periodic

Explain one main property of elements of period 3 in:
(i) Groups I-III
(ii) Groups VI-VII

ne three possible sources of error that may cause variation of intended concentration when ring a dilute solution for titration.

three differences between Chemistry teacher's Guide and Teacher's Manual.

half- reaction and Standard Reduction Potentials of Cobalt and Lead at 25° are given as ows:

$\rightarrow Co^{2+}_{(aq)} + 2e$ $\quad E^\circ = 0.28V.$

$_{(aq)} + 2e \rightarrow Pb_{(s)}$ $\quad E^\circ = -0.13V.$

Calculate the standard e.m.f. of a cell,
given that $[Co^{2+}] = 0.25M$ and $[Pb^{2+}] = 0.18M$.

Giving one reason, state whether the reaction is spontaneous.

SECTION B (30 Marks)

Answer **two (2)** questions from this section.

What does the term 'order of reaction mean?'

Use experimental results in the following Table to answer the questions that follow.

Table of hypothetical experimental data

Experiment	Concentrations (mol/dm^3)		Initial rates ($mol/dm^3/s$)
	[P]	[Q]	
1	0.5	2.0	8.0
2	0.5	3.0	18.0
3	1.00	3.0	36.0

(i) Write the rate equation for this reaction.
(ii) Calculate the order of reaction.
(iii) Find the rate constant.
(iv) Find the rate of reaction when initial concentration of Q is decreased to 0.75 mol/dm^3 in experiment 2.

12. Account for the following facts:

(a) Iron (II) chloride cannot be prepared by heating iron in dry hydrogen chloride gas.

(b) It is unsafe to store hot concentrated sulphuric acid using aluminium container.

(c) Concentrated sulphuric acid cannot be used to dry hydrogen sulphide gas.

(d) It is not possible to prepare aluminium carbonate from sodium carbonate and aqueou solution of aluminium salt.

(e) Acidified potassium permanganate is decolourised by continuous addition of hydroge peroxide.

13. Form four students in school W conducted a project to determine the properties of soil in school garden. A 45.00 cm^3 of sample solution required 3.00 cm^3 of 0.01M sodium hydroxi for complete neutralization.

(a) Calculate the pH of the soil.

(b) Giving two reasons, explain whether or not the soil is suitable for gardening.

(c) Suggest three methods that can be used to raise the soil to an optimum pH.

14. For each of the following reactions: show, with the aid of chemical equations, the m products; and name the type of reaction/method involved.

(a) $C_6H_6 + C_2H_5Br \xrightarrow{AlBr_3}$

(b) $CH_3CH_2CH_2I + Na \rightarrow$

(c) $[(CH_3C)_2]_2 + O_3 \rightarrow$

(d) $C_7H_8 + Cl_2 \xrightarrow{uv/control}$

(e) $CH_{4(g)} + O_{2(g)} \rightarrow$

SECTION C (40 Marks)

Answer **two (2)** questions from this section.

As a chemistry teacher, you are required to prepare chemistry practical for your class. Describe how you will prepare 0.05M NaOH for your 20 candidates, given that each candidate requires 100 cm^3.

(a) Briefly explain the four aspects you will consider when moderating a Terminal Examination for Chemistry subject.

(b) Describe the procedures of constructing a table of specification.

Explain five ways in which Information and Communication Technology (ICT) can be used in teaching and learning of Chemistry.

Describe five fundamental principles of teaching and learning of Chemistry.

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